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(71)(72) Applicants and Inventors: PAPA, Renato [IT/IT]; Via Modigliani, 13, I-95030 Gravina di Catania (IT). AMATO, Paolo [IT/IT]; Via Luna, 21 3° traversa, I-95040 Piano Tavola (IT).

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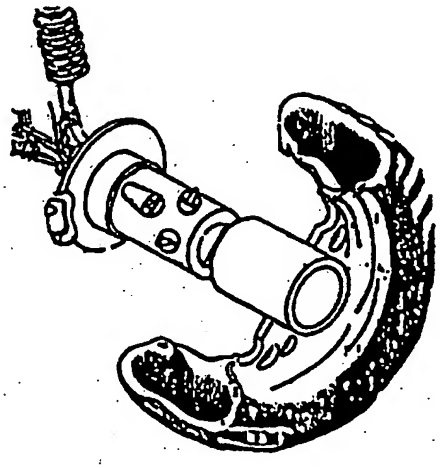
(54) Title: QUICK WHEELS REPLACEMENT WITHOUT BOLTS (OR NUTS)

(57) Abstract

The system consists of a device that has to be installed on car's (or any other vehicle) hubs. The device allows wheels assembling/disassembling without screwing/unscrewing the usual threaded bolts (or nuts). The wheel is clutched to the hub by an easy pushing against the hub, so that the pressure causes the radial extrusion of four pins from the device. Each pin fits in one of four corresponding holes that are made ready in the disc wheel or in a circular groove inside the wheel sleeve. The pins are forced out by the hydraulic thrust of four small rams that are activated by the central sleeve of the disc wheel which slides progressively on the hub. After the assembling completion, the four pins are properly secured. The wheel can be disassembled by manual starting up of the pins release mechanism.



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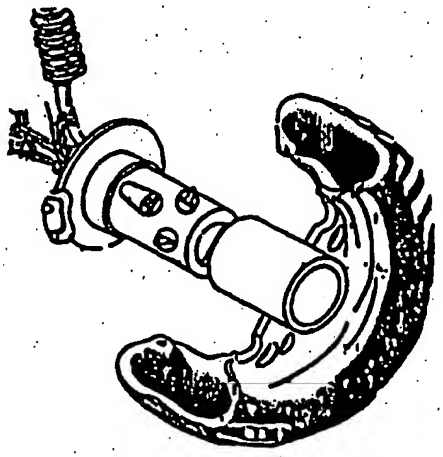

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Description

Quick wheels replacement without bolts (or nuts)

Technical Field

The system consits of a device that has to be installed on cars (or any other vehicle) hubs. The device allows wheels assembling/disassembling without screwing/unscrewing the usual threaded bolts (or nuts).

Background Art

Changing a wheel is currently requiring a sequence of time consuming operations, i.e.:

1. bolts (or nuts) unscrewing (normally from 3 to 5 in car's wheel) by means of proper spanner;
2. wheel taking out from hub;
3. wheel putting in and contemporaneous alignment of stud holes with the threaded holes (or studs) in the hub;
4. screwing the bolts (or nuts) and fastening them by proper spanner, to the correct torque.

It is widely recognised that the above operations are not simple because of frequent difficulties which have to be faced, e.g.:

a. to unscrew bolts (or nuts) that requires a significant muscular strength;

b. to hold the wheel for keeping aligned disc and hub's holes.

Moreover, the handling of bolts and spanner causes unpleasant smearing of the hands.

Disclosure of Invention

For obtaining the rapid change of the wheels it is required;

a. to install the cylinder-shape device on the hub (fig. 1);

b. to equip the disc wheel (rim) with a central sleeve that is properly shaped to couple with the device (fig. 2).

The proposed system eliminates all the mentioned disadvantages, and allows the wheel replacement in a few simple, time saving operations with no strength required.

The assembling will be carried out with the simple and quick movement which is required to place the wheel on the hub. A moderate physical effort is required only for pushing forward the wheel while it is approaching the hub. The pressure of the disc wheel it self, against the hub, puts in action the mechanism of the device; the four pins will then come out from the device (fig. 3), that is fully matchable with the hub, and will seat in four corresponding holes (or in an holder) made ready in the central sleeve of the disc wheel (rim) (fig. 4).

The pins' extrusion is obtained by hydraulic (oil) thrust of four small rams that are activated by the progressive sliding of the hub into the central sleeve of the disc wheel (rim); the internal surface of the sleeve is shaped on purpose (fig. 5 - 6 - 7).

The oil is housed inside the device (fig. 8) and it is help pressurised by a piston (fig. 9) fitted from the exterior surface of the device. Proper caps make sure the seal of piston, small rams and pins (fig.

7 - 8).

On the internal surface of the sleeve, at one end of special grooves (fig. 12 n. 1), are placed suitable shaped cams (fig. 12 n. 2) which progressively transmit adequate pressure for pushing in the four small rams (fig. 13 n. 1). The movements of the small rams transmit the hydraulic thrust to the pins so that, when the sleeve is completely fitted on the hub, they come quickly off (fig. 13 n. 2) and take position inside the corrisponding holes (or groove) of the sleeve (fig. 4) at this time the wheel is tightly fastened to the hub (fig. 14).

The whole assembling operation is just a few seconds long.

The effort required is only to lift up the wheel and to approach its central part to the hub. These are operations similar to the current ones that also require the further screwing and fastening of the bolts (or nuts). With the proposed system only a moderate pressure against the hub is required to obtain in a little while assembling and fastening of the wheel.

To avoid the accidental pins release, a suitable safety cap (or hub cover) (fig. 15) will be externally fitted to the wheel. This cap is moulded to have four arms with crescent-shape ends that will plug in suitable narrowing (slot) made in the pins (fig. 16).

To disassemble the wheel it is sufficient to take down the safety (fig. 19) cap and, by means of a proper spanner (fig. 20), to rotate anticlockwise the end part of the device (fig. 18 n. 2). This will cause the release of the ram that holds the hydraulic system pressure, the consequent release of the pins (fig.

18 n. 3) and the wheel loosening.

As previously stated, it is indispensable to have properly shaped circular rims that have been equipped with the specific sleeve, suitable to house the device.

The hub drives the wheel by means of a frontal joint (with an appropriate number of teeth) or similar devices (such as for example a splined hub an so on). (Fig. 21)

The safety cap may be locked by a key or o clutch (fig. 17).

Claims

Quick wheel replacement - System for the rapid assembling/ disassembling of vehicle's wheels without use of bolts (or nuts) and with which the disc wheel is fastened to the hub by means of four pins that come off from the device and seat inside suitable holes (or a groove) located in the interior surface of the central disc wheel's sleeve.

Quick wheel replacement - System for the rapid assembling/ disassembling of vehicle's wheels without use of bolts (or nuts), in which the pins extrusion is obtained by the hydraulic pressure of the oil housed in the device.

Quick wheel replacement - System for the rapid assembling/ disassembling of vehicle's wheels without use of bolts (or nuts), in which the disc wheel (rim) insertion in the hub puts in action four small rams that by means of the oil contained in the device, transmit an hydraulic thrust to four pins.

Quick wheel replacement - System for the rapid assembling/ disassembling of vehicle's wheels without use of bolts (or nuts), in which the activation of four small rams is obtained by suitable cams that are located at one end of four grooves on the interior surface of the sleeve; the cams movement increases progressively the thrust concurrently to the progressive sliding of the sleeve on the hub.

Quick wheel replacement - System for the rapid assembling/ disassembling of vehicle's wheels without use of bolts (or nuts), in which, after the wheel assembling, to prevent the accidental release of the pins, a suitable safety cap (or hub cover), moulded with four arms with crescent end shape, fits in proper narrowing (slot) made on the pins.

Quick wheel replacement - System for the rapid assembling/ disassembling of vehicle's wheel without use of bolts (or nuts), by which the right hydraulic pressure is obtained operating from the outside on the piston housed in the device.

Quick wheel replacement - System for the rapid assembling/ disassembling of vehicle's wheels without use of bolts (or nuts), in which the pins release is obtained by loosing the piston and by the consequent decrease of the hydraulic pressure inside the system.

Quick wheel replacement - System for the rapid assembling/ disassembling of veicle's wheels without use of bolts (or nuts), by which the hub drives the wheel by means of a frontal joint (with an appropriate number of teeth) or similar device (such as for example a splined hub an so on).

The safety cap may be locked by a key or a clutch

FIG. 01

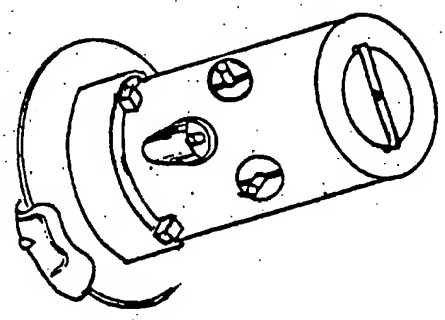


FIG. 02

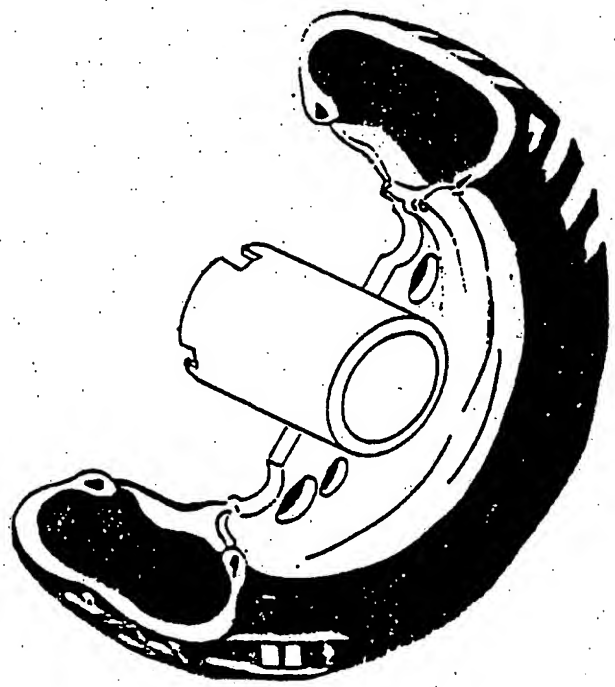
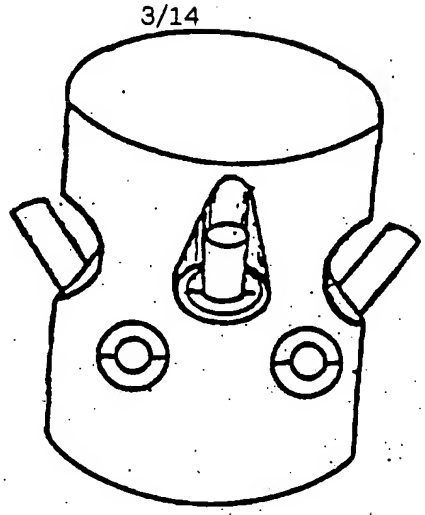


FIG. 03



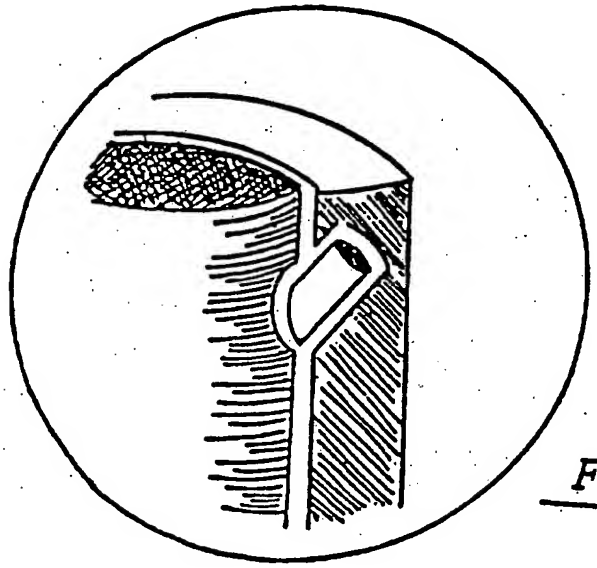


FIG. 04

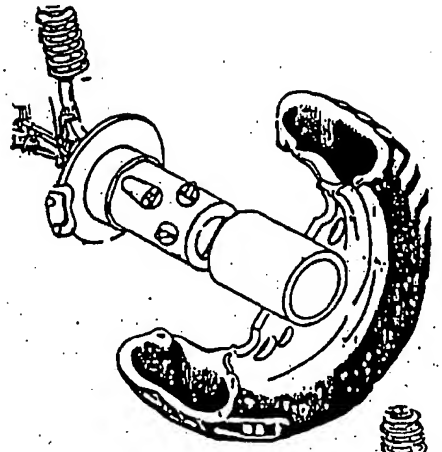


FIG. 05

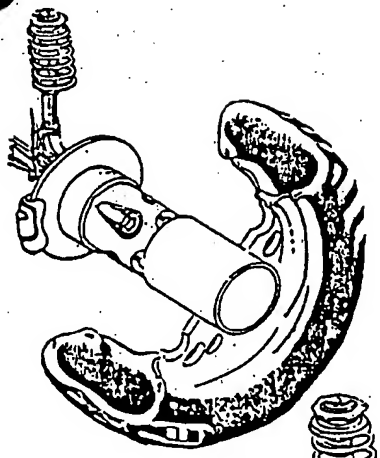


FIG. 06

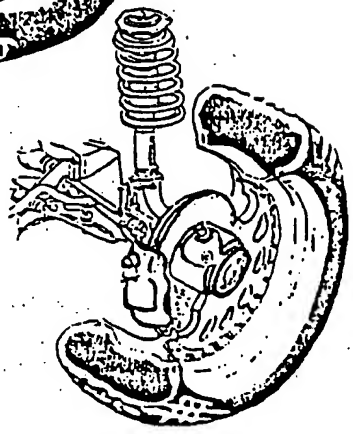


FIG. 07

FIG. 08

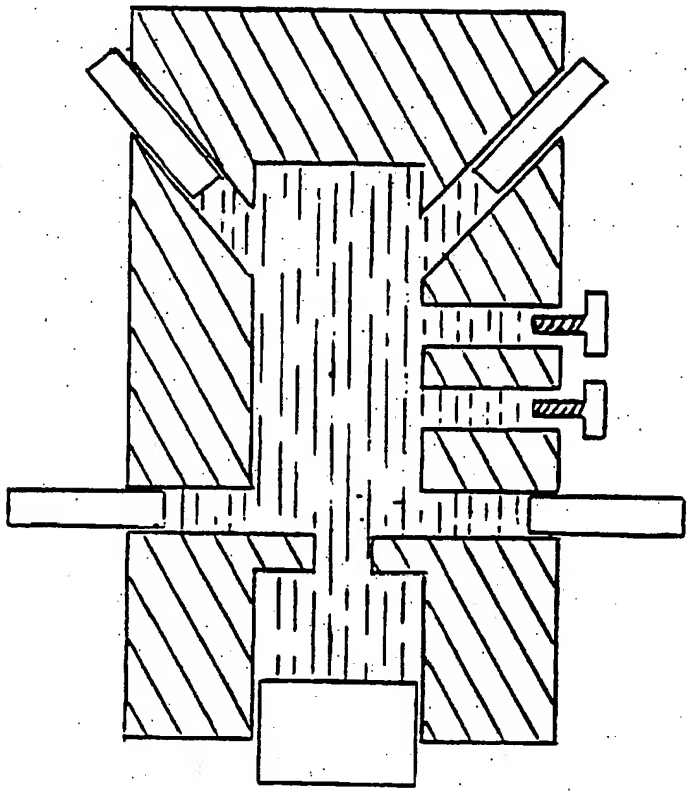


FIG. 09

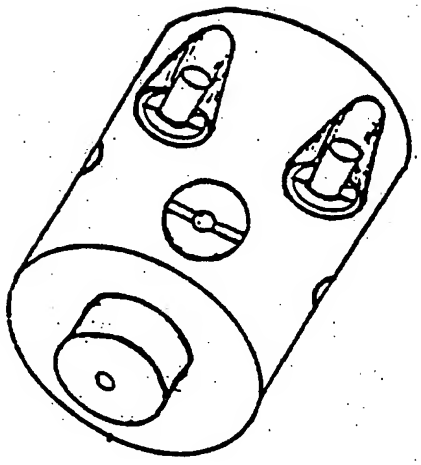


FIG. 10

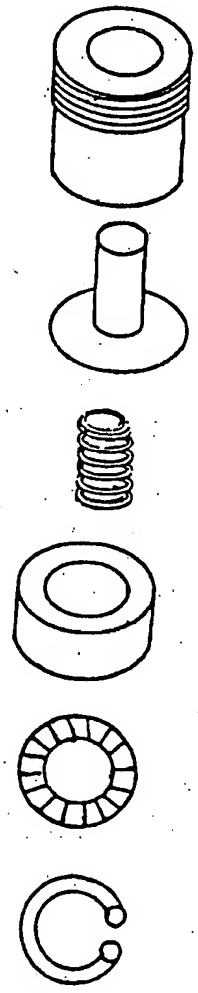


FIG. 11

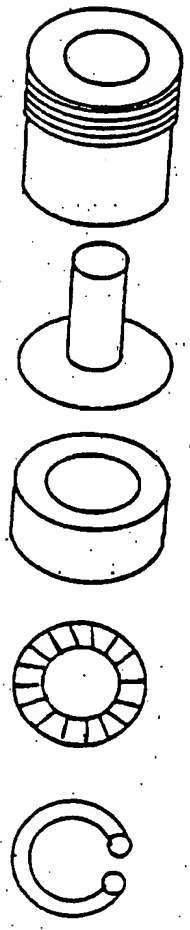


FIG. 12

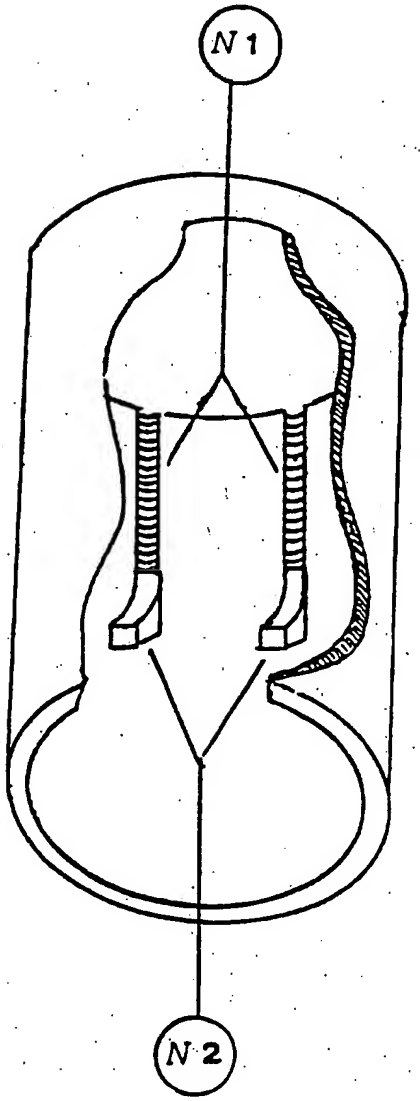


FIG. 13

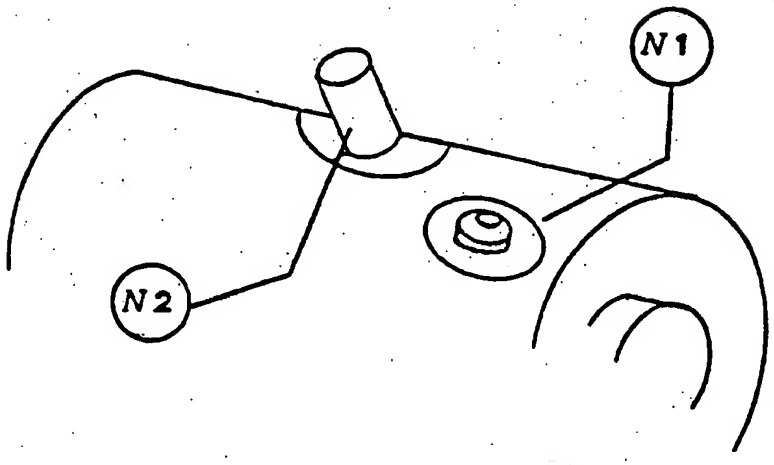


FIG. 14

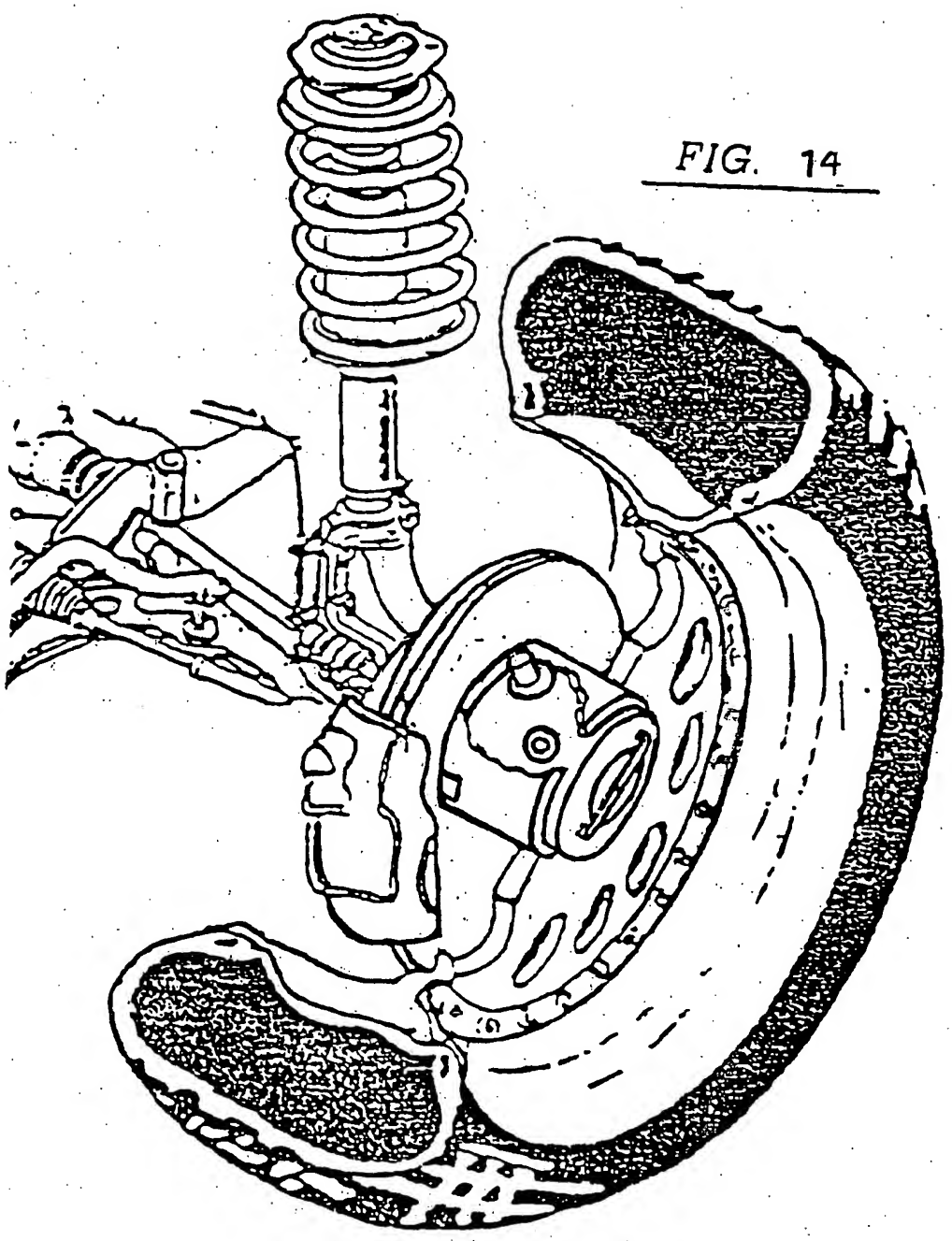
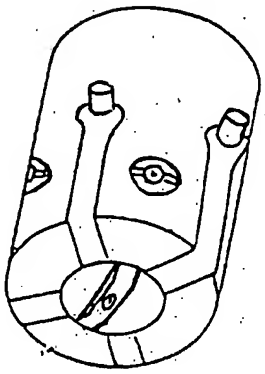


FIG. 15



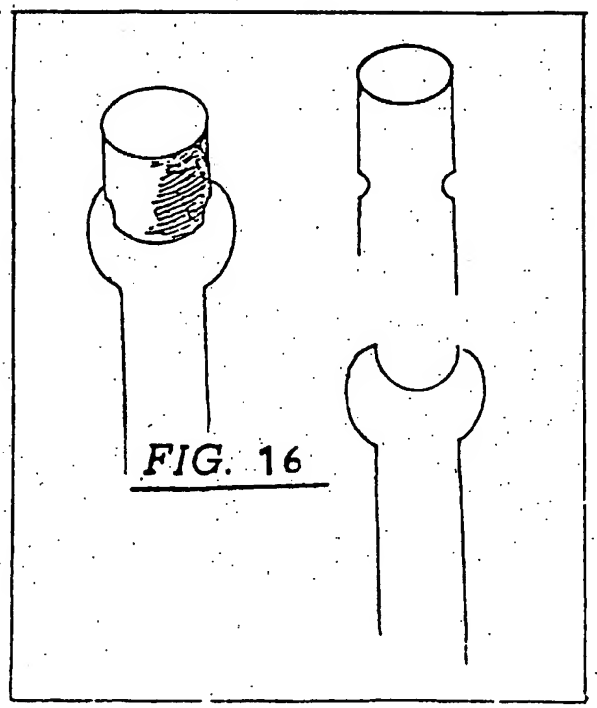


FIG. 16

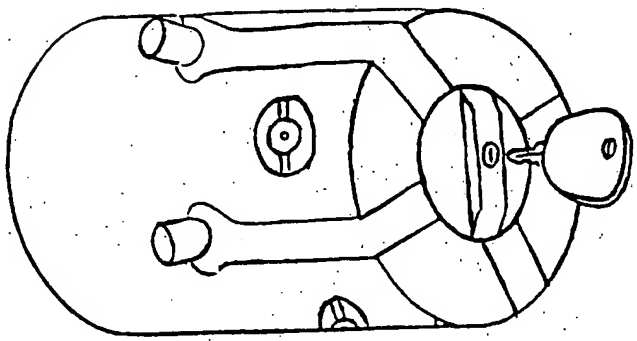


FIG. 17

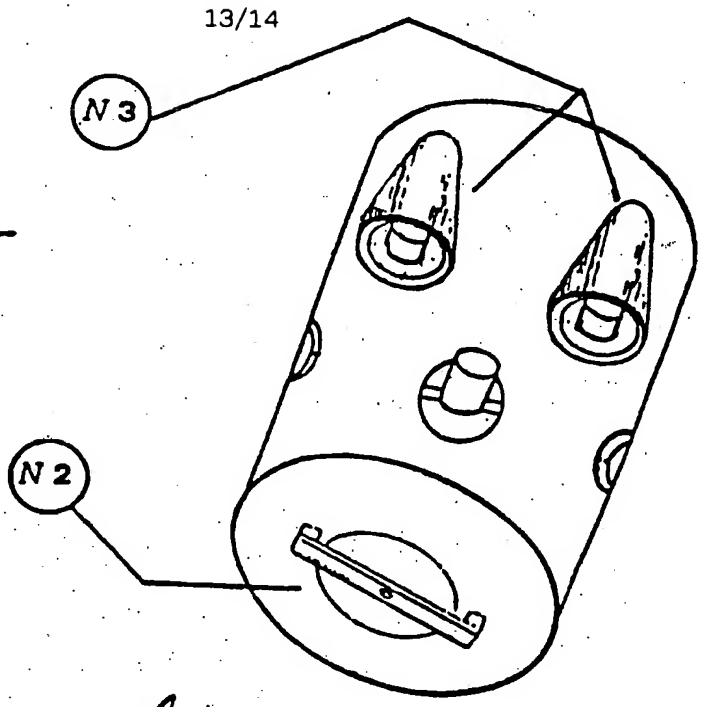


FIG. 18

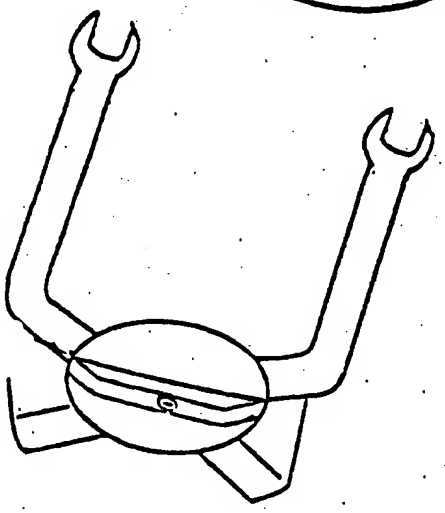


FIG. 19

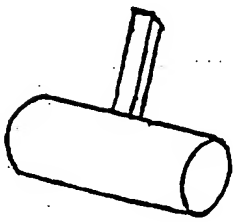
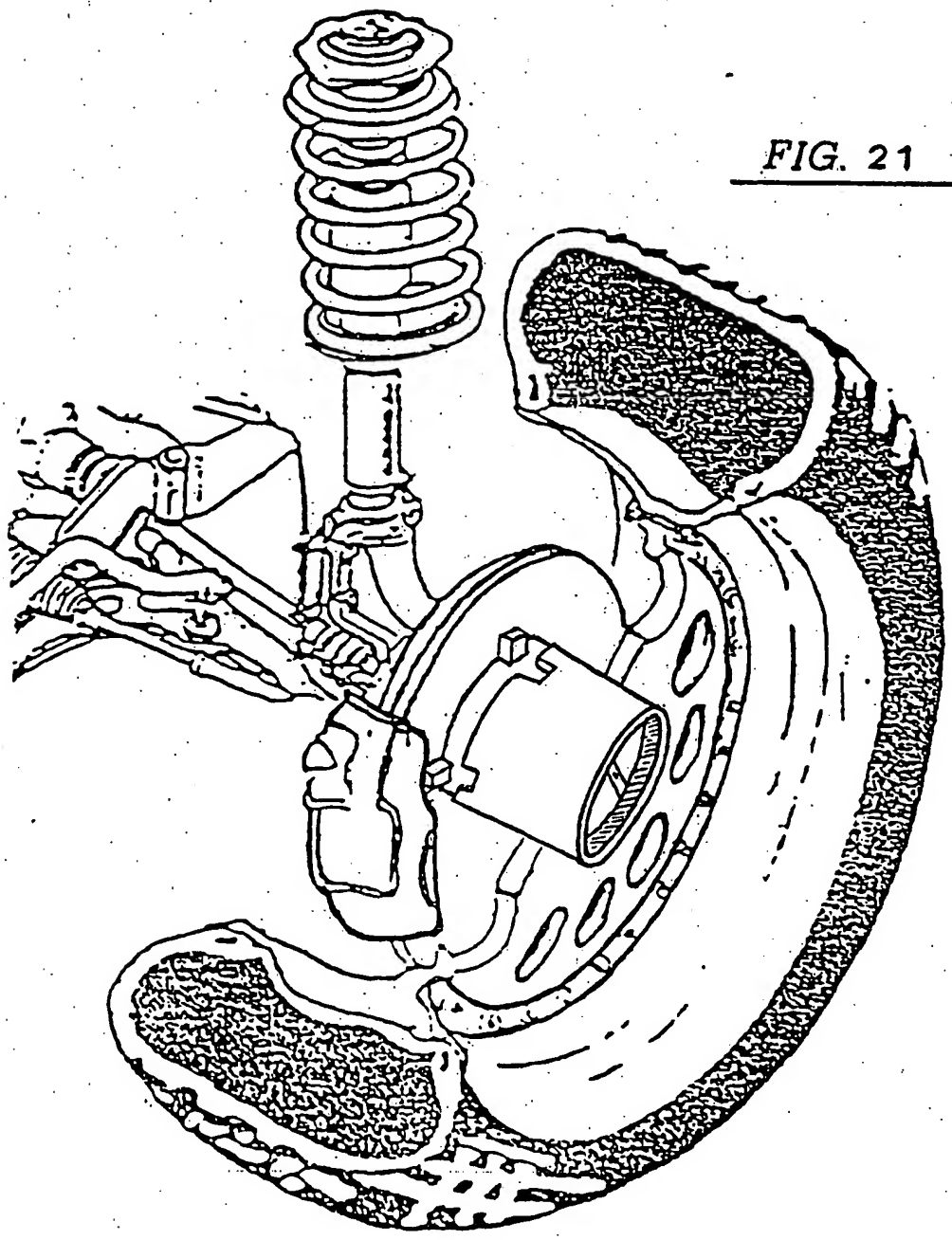


FIG. 20

FIG. 21



INTERNATIONAL SEARCH REPORT

Int ional Application No
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A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 B60B3/14 B60B27/00 F16B1/00 F16B21/10

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	US,A,3 390 916 (SHELTON) 2 July 1968 see column 1, line 57 - column 2, line 67; figures	1 2
Y	PATENT ABSTRACTS OF JAPAN vol. 12 no. 251 (M-718) ,15 July 1988 & JP,A,63 038002 (MASAAKI TAKEUCHI) 18 February 1988, see abstract	2
A	GB,A,199 218 (EDEN) 12 July 1923 see page 1; figures	1
A	FR,E,340 523 (TRENAIL) 21 October 1904 see page 2, line 6 - line 20; figure 1	1
A	US,A,1 910 795 (HALL) 23 May 1933 see figures	1

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DE-C-638105		NONE		
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